

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (previously presented) A persistent p-type group II-VI semiconductor material comprising a thin film of a single crystal group II-VI semiconductor comprising atoms of group II elements and atoms of group VI elements, wherein the group II-VI semiconductor is doped with a p-type dopant selected from phosphorus, arsenic, antimony, bismuth, copper, and chalcogenides of the foregoing, and mixtures thereof, wherein the p-type dopant concentration is sufficient to render the group II-VI semiconductor material in a single crystal form, wherein semiconductor resistivity is less than about $0.5 \text{ ohm}\cdot\text{cm}$, and wherein the carrier mobility is greater than about $0.1 \text{ cm}^2/\text{V}\cdot\text{s}$, and wherein the p-type group II-VI semiconductor material has a luminescent peak at about 3.357 eV.
2. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group II elements are selected from zinc, cadmium, alkaline earth metals, and mixtures thereof.
3. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group VI elements are selected from oxygen, sulfur, selenium, tellurium, and mixtures thereof.
4. (canceled).
5. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about $0.1 \text{ ohm}\cdot\text{cm}$.
6. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about $0.01 \text{ ohm}\cdot\text{cm}$.
7. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about $0.001 \text{ ohm}\cdot\text{cm}$.
8. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the carrier mobility is greater than $0.5 \text{ cm}^2/\text{V}\cdot\text{s}$.

9. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the carrier mobility is greater than $4 \text{ cm}^2/\text{V}\cdot\text{s}$.

10. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is in the range from about 10^{16} to about 10^{22} atoms/ cm^3 .

11. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is greater than about 10^{16} atoms· cm^{-3} .

12. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is in the range from about 10^{17} to 10^{19} atoms· cm^{-3} .

13. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group II-VI semiconductor material is deposited as a thin film on an amorphous self supporting substrate surface.

14. (previously presented) A persistent p-type zinc oxide semiconductor material comprising single crystal zinc oxide that is doped with a quantity of arsenic, wherein the arsenic concentration is sufficient to render the zinc oxide a p-type semiconductor in a single crystal form, wherein semiconductor resistivity is less than about $0.5 \text{ ohm}\cdot\text{cm}$, and wherein the carrier mobility is greater than about $0.1 \text{ cm}^2/\text{V}\cdot\text{s}$, and wherein the p-type zinc oxide semiconductor material has a luminescent peak at about 3.357 eV.

15. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about $0.1 \text{ ohm}\cdot\text{cm}$.

16. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about $0.01 \text{ ohm}\cdot\text{cm}$.

17. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about $0.001 \text{ ohm}\cdot\text{cm}$.

18. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the carrier mobility is greater than $0.5 \text{ cm}^2/\text{V}\cdot\text{s}$.

19. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the carrier mobility is greater than $4 \text{ cm}^2/\text{V}\cdot\text{s}$.

20. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is in the range from about 10^{16} to about 10^{22} atoms·cm⁻³.

21. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is greater than about 10^{16} atoms·cm⁻³.

22. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is in the range from about 10^{17} to 10^{19} atoms·cm⁻³.

23. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide is deposited as a thin film on an amorphous self supporting substrate surface.

24. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide further comprises cadmium oxide.

25. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide further comprises magnesium oxide.

26. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide is a non-stoichiometric zinc oxide compound.

27. (canceled).

28. (canceled).

29. (canceled).

30. (canceled).

31. (canceled).

32. (canceled).

33. (canceled).

34. (canceled).

35. (canceled).

36. (canceled).

37. (canceled).

38. (canceled).

39. (canceled).

40. (canceled).
41. (canceled).
42. (canceled).
43. (previously presented) A persistent p-type zinc oxide semiconductor material comprising single crystal zinc oxide that is doped with a quantity of phosphorous, wherein the phosphorous concentration is sufficient to render the zinc oxide a p-type semiconductor in a single crystal form, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 cm²/V·s, and wherein the p-type zinc oxide semiconductor material has a luminescent peak at about 3.357 eV.
44. (previously presented) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the resistivity is less than about 0.001 ohm·cm.
45. (previously presented) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the carrier mobility is greater than 4 cm²/V·s.
46. (previously presented) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the arsenic concentration is in the range from about 10¹⁶ to about 10²² atoms·cm⁻³.
47. (previously presented) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the zinc oxide further comprises cadmium oxide.
48. (previously presented) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the zinc oxide further comprises magnesium oxide.